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10/645,837	08/22/2003	Thomas Kallstenius	2380-763	8130

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ARLINGTON, VA 22203

EXAMINER

JUNTIMA, NITTAYA

ART UNIT	PAPER NUMBER
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2616

MAIL DATE	DELIVERY MODE
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10/31/2007

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/645,837

Applicant(s)

KALLSTENIUS, THOMAS

Examiner

Nittaya Juntima

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 August 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-70 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 18-33 is/are allowed.
- 6) ☒ Claim(s) 1-4, 6-11, 13-15, 34, 35, 37, 38, 40-42, 45-47, 55, 56, 58-60, 63 and 64 is/are rejected.
- 7) ☒ Claim(s) 5, 12, 16, 17, 36, 39, 43, 44, 48-54, 57, 61, 62 and 65-70 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 8/21/07.
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- ☐ Notice of Informal Patent Application
- ☐ Other: _____.

DETAILED ACTION

1. This action is in response to the amendment filed on 8/6/2007.
2. The objections to the drawings, specification, and claims and the rejection under 35 U.S.C. 112, second paragraph are withdrawn in view of applicant's amendment.
3. Claims 1, 11, 15, 34-35, and 42 are currently rejected under 35 U.S.C. 102(e).
4. Claims 2-4, 6-10, 13-14, 37-38, 40-41, 45-47, 55-56, 58-60, and 63-64 are currently rejected under 35 U.S.C. 103(a).
5. Claims 5, 12, 16-17, 36, 39, 43-44, 48-54, 57, 61-62, and 65-70 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.
6. Claims 18-33 are allowed.

Claim Rejections - 35 USC § 102

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

8. Claims 1, 11, 15, 34-35, and 42 are rejected under 35 U.S.C. 102(e) as being anticipated by an art of record, Skelly (US 6,661,810 B1).

Regarding claims 1 and 11, Skelly teaches a communication system comprising:

A first node (a sender and the user, collectively) having a first oscillator (a sender must have an oscillator 124, Fig. 2 since the data packets sent from the sender contain the sender time stamp) for sending multiple messages over a network and including or associating with each message a first timestamp (the sender time stamp) corresponding to a time when the first node sent that message (col. 9, lines 1-10 and col. 4, lines 44-56).

A second node (a receiver) having a second oscillator (a receiver must have an oscillator 124, Fig. 2 since the data packets sent from the sender and received at the receiver contain the receiver time stamp) for receiving each message and associating with that message a second timestamp (the receiver time stamp) corresponding to a time when the second node received that message (col. 9, lines 1-10 and col. 4, lines 44-56).

Wherein one of the first and second nodes (a sender and the user, collectively) is configured to determine for each message a first time difference (the difference between the sender time stamp and the receiver time stamp) between the corresponding first and second timestamps, and from multiple first time differences, to fit a line to two or more minimum delay values of the first time differences (a line that is the closest line to data points representing the minimum delay is fit), a characteristic of the line being related to a frequency drift between the first and second oscillators (the slope of the line provides a reliable estimate of clock skew, col. 9, lines 10-26, see also col. 7, lines 7-20 and 64-67 and Fig. 4).

Wherein the one node (a sender and the user, collectively) is configured to determine from the line a frequency adjustment to synchronize the first and second oscillators (the slope of the line provides a reliable estimate of clock skew, col. 9, lines 24-26, 40-58, see also col. 1, lines 40-46, 55-col. 2, lines 1-3).

Regarding claim 15, it is inherent that the one node is must be configured to determine an optimal number of minimum values of the first time differences to be use in fitting the line since measurements of end-to-end delay are taken over a plurality of time periods sufficient to fit a line (col. 9, lines 1-26). Note that "an optimal number" is relative and how the optimum number is determined is not claimed, therefore, as long as sufficient number of end-to-end delays are measured and plotted for line fitting, an optimal number of minimum values of the first time differences must be predetermined/judged by the one node.

Claims 34, 35, and 42 are method claims corresponding to system claims 1, 11, 15, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 1, 11, 15, respectively.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. Claims 2-3, 6-10, 38, and 45-47 are rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record, Skelly (US 6,661,810 B1) in view of another art of record, WO 02/13421 (hereinafter "Lundh").

Regarding claim 2, Skelly does not teach that the first node is configured to adjust the first oscillator using the frequency adjustment.

However, Lundh teaches a similar frequency synchronization system in which a slave timing unit (equivalent to the first node) is configured to adjust its oscillator (equivalent to the first oscillator) using a synchronization adjustment value (equivalent to frequency adjustment). See page 7, lines 1-12 and claim 32.

Given the teaching of Lundh, it would have been obvious to one skilled in the art at the time of the invention to modify the teaching of Skelly to include that the first node is configured to adjust the first oscillator using the frequency adjustment as claimed. The suggestion/motivation to do so would have been to enable the initiating node (equivalent to the first node) to adjust the frequency of its oscillator when the initiating node is a slave timing unit as taught by Lundh (page 7, lines 1-2 and 9-11).

Regarding claims 3 and 6, Skelly does not teach that the first node is configured to send a message to the second node to adjust the second oscillator using the frequency adjustment/the one node is the first node configured to send a message to the second node that includes the frequency adjustment for adjusting the second oscillator.

However, Lundh teaches a similar frequency synchronization system in which a master timing unit (equivalent to the first node) sends a synchronization adjustment command message having the synchronization adjustment value to the slave timing unit (equivalent to sending a message to the second node to adjust the second oscillator using the frequency adjustment). See page 6, lines 5-9 and 12-23.

Given the teaching of Lundh, it would have been obvious to one skilled in the art at the time of the invention to further modify the teaching of Skelly such that the first node would be configured to send a message to the second node to adjust the second oscillator using the frequency adjustment/the one node is the first node configured to send a message to the second node that includes the frequency adjustment for adjusting the second oscillator as claimed. The suggestion/motivation do so would have been to enable the slave timing unit (equivalent to the second node) to perform the frequency adjustment to its oscillator and notify the master unit (equivalent to the first node) as taught by Scott (page 6, lines 9-11).

Regarding claim 7, Skelly teaches and that the messages are transported over a packet-switched network (col. 9, lines 1-6). Skelly does not teach that the first node is a timeserver and the other node is a client node as claimed.

Lundh teaches a similar frequency synchronization system in which a slave timing unit (equivalent to a client node) can transmit the message with timestamps t1, t2, and t3 to a master timing unit (equivalent to a timeserver) in order for the master timing unit to determine a synchronization adjustment value based on timestamps t1, t2, t3, and t4 (page 5, lines 26-page 7, lines 1).

Given the teaching of Lundh, it would have been obvious to one skilled in the art at the time to modify the teaching of Skelly such that the node would be a timeserver and the other node would be a client node as claimed. The suggestion/motivation to do so would have been to enable the master timing unit determine a synchronization adjustment value for the slave timing unit as taught by Lundh (page 6, lines 5-9).

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Regarding claim 8, although Skelly teaches that the system is a mobile communications system (cellular, col. 3, lines 66-col. 4, lines 1-2), Skelly does not that the first node is a radio network controller and the second node is a radio base station.

However, Lundh teaches a similar frequency synchronization system in which a system is a mobile communications system having a master timing unit that can be located in RNC (equivalent to the first node is a radio network controller) and a slave timing unit that can be located in BS (equivalent to the second node is a radio base station) (see page 7, lines 14-20), and that the messages between the radio base station and the radio network controller are packet-switched (messages are transported over IP network, page 8, lines 4-6).

Given the teaching of Lundh, it would have been obvious to one skilled in the art at the time of the invention to modify the teaching of Skelly such that the first node would be a radio network controller and the second node would be a radio base station. The suggestion/motivation to do so would have been to enable the timing units of the RNC and BS of the mobile communications system to be synchronized.

Regarding claims 9 and 10, although Skelly teaches that the system is a mobile communications system (cellular, col. 3, lines 66-col. 4, lines 1-2), Skelly does not that the first node is a radio base station, the second node is a radio network controller, and that the messages between the radio base station and the radio network controller are packet-switched.

However, Lundh teaches a similar frequency synchronization system in which a system is a mobile communications system having a master timing unit that can be located in BS (equivalent to the first node is a radio base station) and a slave timing unit that can be located in

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RNC (equivalent to the second node is a radio network controller) (see page 7, lines 14-20 and claim 38), and that the messages between the radio base station and the radio network controller are packet-switched (messages are transported over IP network, page 8, lines 4-6).

Given the teaching of Lundh, it would have been obvious to one skilled in the art at the time of the invention to modify the teaching of Skelly such that the first node would be a radio base station and the second node would be a radio network controller. The suggestion/motivation to do so would have been to enable the slave unit of the mobile communications system to be located in a diversity handover unit situated at the control node, i.e., RNC as taught by Lundh (page 7, lines 14-16).

Claims 38, 45, 46, and 47 are a method claim corresponding to system claims 3, 7, 8, and 10, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 3, 7, 8, and 10, respectively.

11. Claims 4, 13, 14, 37, 40, 41, 55-56, 58-60, and 63-64 are rejected under 35 U.S.C. 103(a) as being unpatentable over an art of record, Skelly (US 6,661,810 B1).

Regarding claim 4, Skelly does not explicitly teach that the second node is configured to adjust the second oscillator using the frequency adjustment.

However, since Skelly teaches that the clock skew represents the different frequencies between the sender's and the receiver's clocks (col. 1, lines 55-58) and the slope of the line provides an estimate of clock skew (col. 9, lines 24-26), it would have then been obvious to one

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skilled in the art at the time of the invention to further modify the teaching of Skelly to include that the second node is configured to adjust the second oscillator using the frequency adjustment, i.e., the estimated clock skew. The motivation to do so would have been to correct the second oscillator's frequency using the slope/estimated clock skew, thereby enabling frequency synchronization between the first and second nodes.

Regarding claims 13 and 14, skelly does not teach that the one node is configured to determine an equation of a line that intersects the two minimum first time difference values.

However, an examiner notice is taken that it is well known that when a line having a slope of "a" is plotted on a graph with y-axis and x-axis in which the slope "a" is determined from the x and y values, i.e., slope "a" = $(y_2 - y_1) / (x_2 - x_1)$, a linear equation $y = ax + b$ can be determined and that it is well known, when calculating the slope of a linear line, to select two measured values having coordinates (x_1, y_1) and (x_2, y_2) that are farthest apart in order to obtain a slope of the line that covers as many measured values as possible and minimize any measurement errors.

Therefore, since Skelly teaches that a line 202 in Fig. 4 intersects two minimum delay values in region 208 and that the slope of the line 202 is the rate of changed of the minimum delay or skew (col. 7, lines 53-67 and col. 9, lines 19-26), it would have then been obvious to one skilled in the art at the time of the invention to determine an equation of a line (i.e., $y = ax + b$) that intersects (passing through) two minimum first time difference values which are determined from the multiple time differences that are farthest apart. The motivation to do so would have

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been to calculate the slope of the line based on as many measured values as possible, thereby minimizes any measurement errors.

Claims 37 and 40-41 are method claims corresponding to system claims 4 and 13-14, respectively, and are therefore rejected under the same reason set forth in the rejection of claims 4 and 13-14, respectively.

Claims 55-56, 58-60, 63, and 64 contain similar limitations (a first node of claim 55 reads a second node of claim 1, and a controller of the second node inherently reads on the node's processor and its user) as recited in the claims 1, 11, 13-15, 7, and 9, respectively, and therefore are rejected for the same reason set forth in the rejection of claims 1, 11, 13-15, 7, and 9, respectively, with an exception that the controller of the second node determines the first time differences, fits a line to two or more minimum delay values, and determines a frequency adjustment from the line, not the first node as rejected in claim 1. However, it would have been obvious to one skilled in the art at the time of the invention to modify the teaching of Skelly such that steps of determining the first time differences, fitting the line, and determining the frequency adjustment would be performed by the controller of the second node and its user instead of the first node such that the clock skew as observed by the second node would be obtained, and such modification only involves routine skills in the art.

Conclusion

12. Any inquiry concerning this communication or earlier communications from the

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examiner should be directed to Nittaya Juntima whose telephone number is 571-272-3120. The examiner can normally be reached on Monday through Friday, 8:00 A.M - 5:00 P.M.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu can be reached on 571-272-3155. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Nittaya Juntima
October 25, 2007

NJ



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